

“Terms and Condition” to Provide Information in a SWPPP

Distinct from the effluent limitation provisions in the permit, the permit requires the discharger to prepare a Stormwater Pollution Prevention Plan (SWPPP) for its facility. The SWPPP is intended to document the selection, design, installation, and implementation (including inspection, maintenance, monitoring, and corrective action) of control measures being used to comply with the special conditions set forth in Part I.D. of the permit. In general, the SWPPP must be kept up-to-date, and modified whenever necessary to reflect any changes in control measures that were found to be necessary to meet the effluent limitations in this permit.

The requirement to prepare a SWPPP is not an effluent limitation, rather it documents what practices the discharger is implementing to meet the special conditions in Part I.D and the effluent limitations in Part I.A. of the permit. The SWPPP is not an effluent limitation because it does not restrict quantities, rates, and concentrations of constituents which are discharged. Instead, the requirement to develop a SWPPP is a permit “term or condition” authorized under sections 402(a)(2) and 308 of the Act. Section 402(a)(2) states, “[t]he Administrator shall prescribe conditions for [NPDES] permits to assure compliance with the requirements of paragraph (1) of this subsection, including conditions on data and information collection, reporting, and such other requirements as he deems appropriate.” The SWPPP requirements set forth in this permit are terms or conditions under the CWA because the discharger is documenting information on how it intends to comply with the effluent limitations (and inspection and evaluation requirements) contained elsewhere in the permit. Thus, the requirement to develop a SWPPP and keep it updated is no different than other information collection conditions, as authorized by section 402(a)(2), in other permits.

It should be noted that EPA has developed a guidance document, “Developing your Storm Water Pollution Prevention Plan – A guide for Industrial Operators (EPA 833-B09-002), February 2009, to assist facilities in developing a SWPPP. The guidance contains worksheets, checklists, and model forms that should assist a facility in developing a SWPPP.

BP captures and treats most of its contaminated stormwater from the refinery area in its WWTP then discharges it through outfall 005. To increase the amount of stormwater that is captured and sent to the WWTP, BP built a new stormwater equalization tank (alternative storage) with a capacity around 11.6 million gallons.

The additional stormwater generated from the new CXHO process units is estimated at 1.5 mgd based on a 3.61 in. (24-hr, 5-year) storm event on a net increase of 19 acres. However, for design engineering, a storm event of 5.22 in (24- hour 25- year) of rain is used.

According to BP there are no circumstances where it be necessary for BP to discharge flows from the equalization tank without sending those flows to the WWTP. BP has never discharged flows from the equalization tank without sending those flows through the WWTP.

All three equalization tanks can be used for storing water if needed. BP should never have to bypass these tanks. There is over 30 million gallons of capacity. BP typically discharges approximately 15-19 million gallons per day of treated water, and they have only one tank in service as equalization.

In effect since BP contains the stormwater associated with industrial activity through the use of the existing and new equalization basins, it allows BP to send this stormwater through its existing treatment system prior to discharging through Outfall 005. IDEM has updated the language to continue the requirements of Part I.D. and Part I.E. only for discharges of stormwater associated with Industrial Activity from Outfalls 003 and 004. IDEM with the help of US EPA have modified the language in Part I.D and E to better reflect actual conditions at the BP Whiting Facility.

Public availability of documents

Part I.E.2.d(2) of the permit requires that the permittee retain a copy of the current SWPPP at the facility and it must be immediately available, at the time of an onsite inspection or upon request, to IDEM. Additionally, interested persons can request a copy of the SWPPP through IDEM. By requiring members of the public to request a copy of the SWPPP through IDEM, the Agency is able to provide the permittees with assurance that any Confidential Business Information contained within its SWPPP is not released to the public.

5.8 Water Treatment Additives

In the event that changes are to be made in the use of water treatment additives that could significantly change the nature of, or increase the discharge concentration of the additive contributing to Outfalls 002 or 005 that are greater than the dosage rate identified in the permit application, the permittee shall notify the Indiana Department of Environmental Management as required in Part II.C.1 of this permit. The use of any new or changed water treatment additives or dosage rates shall not cause the discharge from any permitted outfall to exhibit chronic or acute toxicity. Acute and chronic aquatic toxicity information must be provided with any notification regarding any new or changed water treatment additives or dosage rates. The following water treatment additives have been approved for use at the facility:

The following water treatment additives have been approved for use at this facility: 71-D5 PLUS Antifoam, BPB 55715, BPB 59316, BPB 59396, BPB59430, BPB 59455, BPB 59460, BPB 59466, BPB 59470, BPC 60005, BPC 67015, BPC 67280, BPC 67375, BPC 67525, BPC 68160, BPC 68970, BPW 75890, BPW 76030, BPW 76453, CL2OUT1100, Demand Trac 480, Guardion 9405, Phosphoric Acid Solution, Potassium Permanganate, Praestol K122L, Praestol K230FL, Praestol K260FL, Praestol A304OL, Sodium Bisulfite - 40%, Sodium Hypochlorite, 50% sodium hydroxide, Sulfuric acid solution, Hydrochloric acid, Zinc Chloride - 50%, Demand Trac 990, BPB 59396, Y9BH1233, 71D5 Plus Antifoam, Ferric Sulfate, BPB 55715, BPB 59316, ACS 2125, Praestol A3025, Spectrafoc 875, BPW 76001, BPW 76030, BPB 59430, USALCO 38, USALCO GU 55, BPC 68915, BPC 65610.6.0 Permit Draft Discussion.

6.0 Permit Draft Discussion

6.1 Discharge Limitations and Monitoring Requirements

Outfall 005

DISCHARGE LIMITATIONS

TABLE I

Numeric Discharge Limitations, Sampling, and Monitoring Requirements

<u>Parameter</u>	<u>Quantity or Loading</u>		<u>Units</u>	<u>Quality or Concentration</u>		<u>Units</u>	<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>		<u>Monthly Average</u>	<u>Daily Maximum</u>		<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	Report	Report	MGD	----	----	----	Daily	24-Hr. Total
TBOD₅	4,161	8,164	lbs/day	Report	Report	mg/l	1 x Weekly	24 Hr. Comp.
TSS	3,646	5,694	lbs/day	Report	Report	mg/l	2 x Weekly	24 Hr. Comp.
COD	30,323	58,427	lbs/day	Report	Report	mg/l	1 x Weekly	24 Hr. Comp.
Oil and Grease	1,368	2,600	lbs/day	Report	Report	mg/l	1 x Weekly	Grab
Total Phosphorus	Report	Report	lbs/day	1.0	Report	mg/l	1 x Weekly	24 Hr. Comp.
Phenolics (4AAP)	20.33	73.01	lbs/day	Report	Report	mg/l	1 x Weekly	Grab
Ammonia as N	1,030	2,060	lbs/day	Report	Report	mg/l	5 x Weekly	24 Hr. Comp.
Sulfide	23.1	51.4	lbs/day	Report	Report	mg/l	1 x Weekly	24 Hr. Comp.
Total Chromium	23.9	68.53	lbs/day	Report	Report	mg/l	1 x Weekly	24 Hr. Comp.
Hex. Chromium	2.01	4.48	lbs/day	Report	Report	mg/l	1 x Weekly	24 Hr. Comp.
Total Vanadium	50	100	lbs/day	0.28	0.56	mg/l	1 x Monthly	24-Hr. Comp.
Total Mercury								
Final Limits	0.00022	0.00053	lbs/day	1.3	3.2	ng/l	6 x Yearly	Grab
Interim Variance Limits			Annual Average =	8.75	Report	ng/l	6 x Yearly	Grab
Whole Effluent Toxicity								
Chronic	-	-	-	Report	-	TUc	2 x Year	
Temperature	-----	-----	-----	-----	Report	°F	1 X Monthly	Grab
Benzo a pyrene	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24 Hr. Comp.
Total Residual Chlorine	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	Grab
Arsenic	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Copper	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Chloride	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Fluoride	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24 Hr. Comp.
Lead	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Total Dissolved Solids (TDS)	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Manganese	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Selenium	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Strontium	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Sulfate	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.
Nitrate-Nitrite	Report	Report	lbs/day	Report	Report	mg/l	2 X Monthly	24Hr. Comp.

Table 005-2

<u>Parameter</u>	<u>Quality or Concentration</u>		<u>Units</u>	<u>Monitoring</u>	<u>Requirements</u>
	<u>Daily</u>	<u>Daily</u>		<u>Measurement</u>	<u>Sample</u>
pH	<u>Minimum</u>	<u>Maximum</u>		<u>Frequency</u>	<u>Type</u>
	6.0	9.0	s.u.	3 x Weekly	Grab

Flow

This parameter is required of all NPDES permits and is included in this permit in accordance with 327 IAC 5-2-13(a)(2).

BOD₅, COD, Oil and Grease, Phenolics (4AAP), Total Chromium, Hex. Chromium and Sulfide

The Loading effluent limitations for the above noted parameters have been retained from the previous permit in accordance with 327 IAC 5-2-10(11) commonly referred to as anti-backsliding. BP North America has indicated that it is not necessary to request an increase in the loading effluent limitations for these parameters.

Vanadium

BP has been working on removing the source of Vanadium from their wastewater and was successful in eliminating the main source of Vanadium in December, 2011. The highest measured concentration of Vanadium in Outfall 005 since December, 2011 is 0.031 mg/l which is much smaller than the monthly average effluent limit of 0.28 mg/l. The following update is taken from the schedule of compliance report submitted to IDEM on July 24, 2012 regarding compliance with the final WQBEL for Vanadium contained in the existing permit:

BP completed a detailed source survey of the refinery as well as the evaluation of other refinery vanadium sources and effluent data. This review assisted BP in the evaluation of the need for any additional future controls in addition to the strategies already being planned and implemented as described below. Additionally, BP has contracted Purdue Water Institute and Argonne National Labs to evaluate process design, perform metals speciation and characterization and evaluate various technologies associated with vanadium treatment. BP has also employed the services of third party consultants to assist in the evaluation of potential vanadium treatment technologies as well. However it was determined that additional treatment and controls are not needed with the elimination of the SRU TGU Beavon Stretford blowdown, a major source of vanadium. This will allow BP to comply with the effluent limits for Outfall 005 even with the increased processing of Canadian crudes. This unit is planned to be replaced by second quarter 2013.

The Sulfur Recovery Unit (SRU) Beavon Stretford Solution blowdown accounts for a significant discharge of the existing vanadium loading to BP's wastewater treatment plant. This vanadium-based technology will be replaced with non-vanadium based Shell Claus Off-gas Treatment (SCOT). In the interim, until the SCOT units are completed in 2013, Global Sulfur Solutions will be used to manage impurities in the Stretford solution so that there is no longer needed any blowdown of solution with vanadium to the refinery sewer system and will remove the significant source of vanadium in the effluent. This process has been in place since fourth quarter 2011 and we are now

currently meeting the final limits for vanadium.

The Projected Effluent Quality for Vanadium at Outfall 005 since December, 2011, when the Beavon Stretford Solution blowdown containing the source of the Vanadium was discontinued, is the maximum single data point of 0.031 mg/l x the multiplication factor for 7 samples which is 2 = 0.062 mg/l. So the Projected Effluent Quality for Vanadium at Outfall 005 is 0.062 mg/l. The Preliminary Water Quality Based Effluent Limit for Vanadium using the revised Tier II Value for Vanadium is 0.84 mg/l. The Preliminary Effluent Limit (0.84 mg/l) is greater than the Projected Effluent Quality (0.062 mg/l). Therefore based on a preliminary evaluation of the effluent and the recent changes to the source and nature of the discharge, IDEM has concluded that the discharge from Outfall 005 no longer has a reasonable potential to exceed the water quality criteria for Vanadium.

However, because we are only dealing with a limited data set and BP has not completed all of the source reduction changes at the facility, IDEM proposes to retain the existing effluent limits and monitoring requirements for Total Vanadium at Outfall 005 until one year after BP has completed the replacement of the SRU with the SCOT in 2013. BP may then apply for a permit modification at that time to remove the effluent limits and monitoring requirements for Total Vanadium if the results of a reasonable potential analysis still demonstrate that there is not a reasonable potential to exceed the water quality based effluent limit for Vanadium.

The existing effluent limits are being retained in the permit because BP has demonstrated that they are now able to consistently meet the existing limits for Total Vanadium. The anti-backsliding rules found in 327 IAC 5-2-10(11)(B) prohibit IDEM from relaxing the limits for Total Vanadium based on a revised wasteload allocation. When the source of Total Vanadium has been completely eliminated, the permit may be modified to remove the effluent limits and monitoring requirements for Total Vanadium. The 2007 wasteload allocation for BP was updated to reflect the revised lower effluent design flow of 19.9 MGD. The revised WQBELs for Vanadium were calculated to be:

Monthly Average: 0.73 mg/l and 120 lbs/day
Daily Maximum: 1.5 mg/l and 250 lbs/day

The existing final limits are:

Monthly Average: 0.28 mg/l and 50 lbs/day
Daily Maximum: 0.56 mg/l and 100 lbs/day

One year after the Sulfur Recovery Unit (SRU) Beavon Stretford Solution blowdown (vanadium-based technology) has been replaced with non-vanadium based Shell Claus Off-gas Treatment (SCOT), the permittee may request, in writing, a review of the effluent limits and monitoring requirement for Total Vanadium at Outfall 005.

Mercury

Mercury has been found in the effluent in quantities that show a reasonable potential to exceed water quality standards based on the procedures found in 327 IAC 5-2-11.5. Therefore, the permit

will include final effluent limitations for Total Mercury based on the revised lower effluent design flow of 19.9 MGD. The permit will contain interim effluent limits for Total Mercury based on the streamlined mercury variance rule (327 IAC 5-3.5). Mercury will be monitored once every two months.

Phosphorus

Phosphorus is added to the wastewater treatment plant as a micro-nutrient. BP has demonstrated that they can consistently achieve a concentration below 1 mg/l and a removal efficiency that averages an estimated 79%. The ability to accurately measure the percent removal efficiency is severely limited, so the requirement to measure the percent removal is being waived. The effluent shall be limited to a monthly average concentration of 1 mg/l Total Phosphorus in accordance with 327 IAC 5-10-2(a)(2).

Whole Effluent Toxicity

There is not a calculated RPE for WET when there is an alternate mixing zone. BP is required to continue to monitor the effluent from Outfall 005 for Chronic Toxicity. If chronic toxicity is observed by having more than 37 Toxic Units Chronic, then a toxicity reduction evaluation (TRE) will be initiated to determine the cause of the toxicity and to reduce or eliminate the source of the toxicity. See Section 5.4 for discussion of WETT requirements.

pH

This parameter is required of all NPDES permits and is included in this permit in accordance with 327 IAC 2-1.5-8(c)(2). pH must be maintained between 6 to 9 standard units. The effluent shall be sampled 3 x weekly using a grab sample.

Ammonia as N and Total Suspended Solids

As part of the permit renewal application, BP Products North America, LLC requested that the effluent limits for TSS and Ammonia be decreased to the levels that were included in the permit issued on March 5, 1990 due to material and substantial changes at the refinery that will allow BP to achieve compliance with the previous limits for TSS and ammonia. Since this permit modification does not propose any new or increased discharges, antidegradation is not applicable to this permit modification. The effluent limits for TSS and ammonia from the permit issued to BP on March 5, 1990 will be included in this permit renewal.

Additional Parameters for Monitoring

In order to determine a better characterization of the BP effluent and determine how the treatment systems BP has been modifying and/or adding to the existing treatment system effects the effluent quality, prior to the discharge through Outfall 005, IDEM has determined the following parameters are needed to provide an ongoing assessment of treatment performance: Arsenic, Copper, Chloride, Fluoride, Lead, Total Dissolved Solids, Manganese, Selenium, Strontium, Sulfate, and Nitrate-

Nitrite, Temperature (1 X Monthly), Benzo-a-pyrene, and Total Residual Chlorine. All except Temp. will be required to be monitored on a 2 X Monthly basis for discharges through Outfall 005. Outfall 002

TABLE I
Numeric Discharge Limitations, Sampling, and Monitoring Requirements

<u>Parameter</u>	<u>Quantity or Loading</u>		<u>Units</u>	<u>Quality or Concentration</u>		<u>Units</u>	<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>		<u>Monthly Average</u>	<u>Daily Maximum</u>		<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	Report	Report	MGD	----	----	----	Daily	24-Hr. Total
TOC	-	-	-	Report	5.0	mg/l	1 x Yearly	Grab
Total Residual Chlorine	20.0	60.0	lbs/day	0.01	0.02	mg/l	1 x Weekly	Grab
Oil and Grease	-	-	-	Report	5.0	mg/l	1 x Monthly	Grab
Temperature Intake	-	-	-	Report	Report	BTU/Hour	5 x Weekly	Hourly
Discharge	-	-	-	Report	Report	BTU/Hour	5 x Weekly	Hourly
Net (daily average)	-	-	-	1.7×10^9	2×10^9	BTU/Hour	5 x Weekly	Hourly
pH	-	-	-	-	[1]	s.u.	3 x Weekly	Grab

[1] The pH of the effluent shall be no less than 6.0 and no greater than 9.0 standard units (s.u.).

Flow

This parameter is required of all NPDES permits and is included in this permit in accordance with 327 IAC 5-2-13(a)(2).

Total Organic Carbon TOC

The limitation for TOC is based on the U.S. EPA effluent guidelines 40 CFR Part 419.23(d) for discharges of once through non-contact cooling water.

Oil and Grease

The requirement to have no oil and grease greater than 5 mg/l is a technology based effluent limit developed in accordance with 327 IAC 5-5-2 recognizing that there should be no oil and grease introduced into the once-through cooling water. This parameter was a net limit in the previous permit but the reported data has established that the intake does not contain any oil and grease which makes the net limit approach unnecessary. The reported data has never shown the presence of oil and grease, therefore the monitoring frequency has been reduced to 1 x Monthly.

Total Residual Chlorine

The water quality based effluent limitation for continuous total residual chlorine is based on the water quality standards in 327 IAC 2-1.5-8, Table 8-1.

The water quality based effluent limits for chlorine are less than the limit of quantitation (LOQ) of 0.06 mg/l. In accordance with 327 IAC 5-2-11.6(h), the permittee will be

considered to be in compliance with the WQBELs if the effluent concentrations measured are less than the LOQ of 0.06 mg/l.

<u>Parameter</u>	<u>Test Method</u>	<u>LOD</u>	<u>LOQ</u>
Chlorine	4500-Cl-D	0.02 mg/l	0.06 mg/l
	4500-Cl-E	0.02 mg/l	0.06 mg/l
	4500-Cl-G	0.02 mg/l	0.06 mg/l

Case-Specific LOD/LOQ

The permittee may determine a case-specific LOD or LOQ using the analytical method specified above, or any other test method which is approved by the Commissioner prior to use. The LOD shall be derived by the procedure specified for method detection limits contained in 40 CFR Part 136, Appendix B, and the LOQ shall be set equal to 3.18 times the LOD. Other methods may be used if first approved by the Commissioner. BP has submitted their procedure/program for minimizing the amount of chlorine being discharged, therefore the requirement to submit a pollutant minimization program will not be included in the permit.

Temperature

The NPDES permit for BP contains alternate thermal effluent limits established in accordance with 327 IAC 5-7 and Section 316(a) of the Clean Water Act. The alternate limits of a net daily average of 1.7 million BTU/Hour and a net daily average maximum of 2.0 million BTUs/ Hour were developed as a part of the 316(a) approval given to the previous owner of this facility (Amoco Oil Company) on June 16, 1975 by the U.S. EPA. The alternate limits were continued in the permit renewals that occurred prior to this renewal with the last renewal occurring on July 30, 2007. Those renewals were based on the initial 316a study and the fact that no harm to aquatic life has been documented due to the thermal discharge from Outfall 002 since the discharge began operations. The net temperature is calculated by subtracting the temperature value of the intake water from the temperature value of the gross discharge every hour and averaging those values over the 24 hours of each day when sampling occurs.

During the term of the existing NPDES permit issued on July 30, 2007, BP North America, LLC worked with IDEM to develop and conduct an IDEM approved thermal impact study and then submit the results of that study to IDEM to demonstrate that the alternative effluent limitations (existing alternate limits) desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made.

A Type III §316(a) Demonstration (US Environmental Protection Agency (EPA) 1977) was conducted for the Whiting Refinery (then owned by Amoco Oil Company and Union Carbide Corporation in 1975) (Limnetics 1975). The Limnetics study included plume

mapping data collected in 1971-1973 and biological data collected from several power plants in the southern portion of the lake during the same time frame. Limnetics (1975, p. 115) concluded that the thermal effluents from this Refinery "are not expected to appreciably harm the indigenous population of fish, shellfish and associated wildlife." IDEM accepted the demonstration and EPA Region V concurred stating "we have no objections to the State of Indiana granting Amoco's request for alternative thermal effluent limits" (letter from James McDonald, Director, Region V EPA to IDEM dated June 16, 1975).

The current NPDES permit (IN0000108) required that a thermal monitoring/modeling study be conducted, which was completed in 2010 (AECOM 2011). Consistent with a Study Plan approved by IDEM, BP conducted a four-week long field survey in the receiving water near Outfall 002 from September 23 to October 27, 2010.

Results of model scenario runs indicate that the thermal plume extends beyond the 1,000-foot arc encircling the outfall under worst-case scenarios. The proposed future plant conditions with reduced volumes of cooling water discharge are not expected to have any significant impacts on the extent of the thermal plume. The extent of the thermal plume is greatest when wind is from the north and the ambient current direction is towards the southeast.

Based on the thermal plume study results, a §316(a) variance demonstration based on a site-specific biological assessment was determined to be warranted. Section IIIA of the NPDES Permit requires that BP conduct a §316(a) study to justify continuation of the previously approved temperature variance. As conditioned in the permit, BP prepared a study plan for review and approval by IDEM, conducted the approved study, and, within 24 months of approval of the study plan, submitted this §316(a) variance request to IDEM.

Prior to submittal of the biological study plan, IDEM staff were consulted on several occasions to get their input regarding study design. It was agreed that the study should be conducted primarily during the summer and that fish are the only taxonomic group that need to be monitored. It was further agreed that fish near shore would be sampled by electrofishing and those offshore by trawling and gill netting. On May 27, 2011, BP sent an initial draft of the Study Plan to IDEM for review. On June 10, 2011, IDEM requested a number of changes including taking considerably more physicochemical measurements, requesting additional biological metrics, repositioning of two sampling locations, and adding one more offshore location. On July 5, 2011, BP sent a revised study plan to IDEM that addressed the various concerns that IDEM had raised in its letter dated June 10, 2011. BP modified the draft study plan to address IDEM recommendations and IDEM approved the revised study plan on July 8, 2011.

According to Indiana water temperature criteria for Lake Michigan [327 IAC 2-1.5-8(c)], the receiving water temperature cannot be more than 3°F (1.7°C) greater than existing background temperature at a maximum distance of a 1,000-ft arc inscribed from the thermal discharge. Under Indiana water quality criteria, water within the arc can exceed the standard without a thermal variance under §316(a). In addition, the receiving water temperature

outside of the 1,000-ft arc cannot exceed specified monthly temperatures in Lake Michigan (Table 1-2), except when an exceedance can be demonstrated to be caused by the water temperature at the intake.

The following water quality standards are applicable to a discharge to Lake Michigan:

At any time and at a maximum distance of a one thousand (1,000) foot arc inscribed from a fixed point adjacent to the discharge or as agreed upon by the commissioner and federal regulatory agencies, the following shall apply:

- (i) Thermal discharges to Lake Michigan shall not raise the maximum temperature in the receiving water above those listed in the following table, except to the extent the permittee adequately demonstrates that the exceedance is caused by the water temperature of the intake water:

Table 1-2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
°F	45	45	45	55	60	70	80	80	80	65	60	50

- (ii) If the permittee demonstrates that the intake water temperature is within three (3) degrees Fahrenheit below an applicable maximum temperature under subitem (i) above, then not more than a three (3) degree Fahrenheit exceedance of the maximum water temperature shall be permitted.

According to the approved thermal plume study plan, BP conducted a four-week field survey in the receiving water near Outfall 002 from September 23 to October 27, 2010. The Environmental Fluid Dynamics Code (EFDC) model was used to develop the thermal model due to the complex hydrodynamics of the BP Whiting thermal discharge, the resulting plume, and the need to evaluate the thermal plume in three dimensions. The EFDC model was calibrated using the first two weeks of field survey data from September 27, 2010 to October 11, 2010. The calibrated model was then validated using the second two weeks of field survey data from October 11, 2010 to October 25, 2010. Comparison of predicted data and observed data from the validation period indicated that the model calibration was satisfactory based on the United States Environmental Protection Agency technical guidance (USEPA 1990) and professional judgment, and that the model is suitable for predictions outside of the calibration period and for predictions at multiple locations within the model domain.

The calibrated and validated model was used to predict the extent of the thermal plume under a range of worst-case heat dissipation scenarios. The results of model scenario runs indicated that the thermal plume extends beyond the 1,000-ft arc encircling the outfall under worst-case scenarios. The proposed future plant conditions are not expected to have any significant impacts on the extent of the thermal plume. The extent of the thermal plume is greatest when wind is from the north and ambient currents are towards the southeast.

IDEM has reviewed the results of the Thermal Impact Study and the application for alternate thermal effluent limits in accordance with 327 IAC 5-7 and IDEM proposes to allow BP Products North America to continue using the existing alternate thermal effluent limitations at Outfall 002 because IDEM believes that the alternate effluent limitations will ensure the protection and propagation of the balanced and indigenous population of fish, shellfish and wildlife in and on the water body.

pH

This parameter is required of all NPDES permits and is included in this permit in accordance with 327 IAC 2-1.5-8(c)(2). pH must be maintained between 6 to 9 standard units. The effluent shall be sampled 3 x weekly using a grab sample.

Zebra and Quagga Mussel Control

The zebra mussel control program is used for the purpose of killing both adult and juvenile Quagga and Zebra mussels in the refinery once through cooling water system (OTCW). This kill is accomplished by a continuous feed of sodium hypochlorite throughout the year; spring, summer, fall, and winter. Sodium hypochlorite feed will be controlled to maintain 0.25 – 0.5 mg/l total residual chlorine (TRC). De-chlorination will occur using Sodium Bi-sulfite prior to discharge. The use of chlorine to prevent the growth of mussels in the CWIS and the intake pipes is considered to be the application of a FIFRA registered substance in accordance with label instructions and at that time the chlorine is not considered or treated as a pollutant. IDEM has no reason to believe that chlorine is escaping into Lake Michigan due to the fact that it is applied to the CWIS at a point where the intake velocity will pull the chlorine into the CWIS, therefore, IDEM does not believe any additional permit related requirements are needed at this time.

Section 316(b) Cooling Water Intake Structure (CWIS) Requirements

Introduction

The U.S. Environmental Protection Agency (EPA) requires the permit issuing authority to conduct a best professional judgment (BPJ) evaluation of the CWIS to establish that the CWIS is equivalent to the best technology available (BTA). Therefore, the BP Whiting Business Unit (WBU) provided IDEM a description of the CWIS dated 29 August 2012.

Cooling Water Intake Structures Descriptions

Lake Michigan is the water source for both water stations. At the present time, there are two water intakes located approximately 1,330 and 1,440 feet offshore, about 300 feet apart. Although grating exists on the intake system to exclude large debris, no intake screen system exists.

One water intake supplies water to the 1911 tunnel; the other intake supplies water to the 1942 tunnel. These tunnels are tied together near the water stations, so that both tunnels serve both water stations. Although each water station can be isolated for maintenance, the current configuration

does not allow either tunnel intake to be isolated. The tunnels terminate in the suction well located below the floor of each station. All pumps in each station take suction from the station well.

1911 Tunnel and Cooling Water Intake Structure

In 1911 a brick tunnel was constructed into Lake Michigan and connected to the "old" pumping station. The inside dimensions of the brick tunnel are 5 feet 0 inches wide by 5 feet 6 inches high; while the wall thickness data is not known. The length of this tunnel is 2,400 feet from the lake intake to the land shaft located adjacent to the tunnel flush tank. (A land shaft is used during the construction of a tunnel.) This tunnel is still in operation and is connected to the tunnel constructed in 1942 and to the two water stations.

Details of the water intake structure to the 1911 tunnel are not as clear. The intake was originally designed with what appear to be three arms capped with cylindrical screens which fed into a central pipe 8 feet 4 inches in diameter. Over time, modifications have been made to maintain the intake structure in operable condition, but much of the original structure remains intact. One of the screened arms is no longer present and the central pipe is now an open pipe receiving vertical water flow. This intake provides a small proportion of the total design intake flow and is located approximately 1,330 feet offshore.

1929 Flume

The No. 1 Water Station was constructed in 1929. A reinforced concrete tunnel, sometimes called a "flume", also was constructed to connect the land shaft of the 1911 tunnel with the suction well of the No. 1 Water Station. There is a gate well and a sluice gate (manual or electric motor operated) inside No. 1 Water Station to block off the water supply for necessary repairs inside the suction well of No. 1 Water Station. This will not bypass the 1911 intake as flow will continue to No. 2 Water Station.

1942 Tunnel and Intake

The No.2 Water Station was constructed in 1942. Also constructed at this time was a second tunnel into the lake. The length of this tunnel is 2530 feet from its water intake to the 10 feet 0 inch inner diameter reinforced concrete land shaft located northwest of No. 1 Water Station. A gate well (but no sluice gate) is located in this tunnel section. There is a gate well and manually operated sluice gates to block off this tunnel for necessary repairs inside the suction well of No. 2 Water Station.

In the early 1980s, a frazil ice and biological fouling prevention system was put in place. Hot water and chlorine solution are pumped out to manifolds running the circumference of the intake in order to reduce ice and biological growth. This intake provides the majority of the total design intake flow and is located approximately 1,440 feet offshore.

WATER STATION DESCRIPTION AND OPERATION

Water Station Nos. 1 and 2 receive water via both intake tunnels to a wet well located under each water station. All pumps in each station take suction from the station well. No. 1 Water Station

houses five pumps (including one smaller firewater pump) with a design capacity of 117.8 million gallons per day (MGD). One pump was removed, but equipment is still in place for it to be re-installed to satisfy future needs. No.2 Water Station houses four pumps with a design capacity of 146.3 MGD. A recent upgrade to the firewater system included a new pump house for three firewater pumps with a design capacity of 17.3 MGD. This pump house's suction well is tied into the land shaft. The four firewater pumps in No. 1 Water Station and the new firewater pump house operate on demand and are not often in use. The capacity of all three pump houses combined is 281.4 MGD.

Pumps are generally operated by maintaining a pressure of approximately 34 to 35 psig in the main header and the number and combination of pumps turned on at a given time depends on refinery water demand. Therefore, the actual flow at individual pumps or water stations is variable. Flow meters are located at the Lakefront Waste Water Treatment Plant to measure discharge to the lake. Water intake values are, therefore, back-calculated, incorporating losses incurred within the refinery. The calculated total average intake flow from 2009 to 2011 was 91.9 MGD. A theoretical analysis of intake tunnel volumes and frictional impacts estimated that 67 percent of the total water intake flows through the 1942 tunnel and 33 percent through the 1911 tunnel. Estimated flows for the 1942 and 1911 tunnels based on this percentage split are shown in Table 1:

TABLE 1
AVERAGE ACTUAL INTAKE FLOW FROM 2009-2011

Time Period	Intake 1942 Flow	Intake 1911 Flow	Combined Flow
2009	67.4	33.1	100.5
2010	61.8	30.3	92.1
2011	55.9	27.4	83.3
2009-2011	61.7	30.3	92.0

AVERAGE THROUGH-SCREEN VELOCITY

Average through-screen velocity was measured on November 13, 2009, during a routine intake inspection. Divers used a hand-held velocity meter and positioned it along the intake plane at specified locations, orienting the meter until the greatest velocity at each location was observed. Fifteen locations were measured at the 1942 intake and one measurement was taken at the 1911 intake. Average intake flow on November 13 was calculated at approximately 85 MGD. During the period when the diver was taking velocity measurements, pumps were operated at 35 psig to simulate high refinery water demand and increased intake water velocities. The average velocity observed at the 1942 intake was 0.26 feet per second (fps) with a maximum velocity of 0.35 fps. The single velocity measurement for the 1911 intake was made at the center of the intake pipe and had a value of 0.56 fps. This location is likely the maximum velocity of the intake pipe velocity field and the average velocity would therefore be less than this value.

The number of pumps and design capacities were provided in the 29 August 2012 CWIS Documentation. Water enters each pump house from two offshore intake tunnels to a pump house suction well. Pumps draw water from the well for distribution throughout the refinery as well as

supply to other users such as Whiting Clean Energy, Praxair, Ineos Chemical and previously the City of Whiting. The following table No. 1 provides additional information on the intakes

Table No. 1. Water Station Information

Intake Characteristic	Water Station No. 1	Water Station No. 2	Firewater Pump House
Number of debris/fish screens	0	0	0
Number of water pumps	5	4	3
Pump capacity (design)	117.8 MGD	146.3 MGD	13.0 MGD
Intake supplier	Both 1942 and 1911 offshore intakes	Both 1942 and 1911 offshore intakes	Both 1942 and 1911 offshore intakes
Supplied Operation	BP Refinery (process/utility water and once through cooling water, City of Whiting (until 2010), Whiting Clean Energy, Ineos Chemical (until end 2012) and Praxair	BP Refinery (process/utility water and once through cooling water, City of Whiting (until 2010), Whiting Clean Energy, Ineos Chemical (until end 2012) and Praxair	BP Refinery fire water system

(B) There are no dedicated debris screens or fish returns at the pump houses or intakes. Debris screening is achieved at the individual process unit standard pump screens. When the proposed 316(b) Rule is finalized, BP will assess the new regulation requirements, the current intake configuration, and options to remain compliant and protective of the environment. EPA and IDEM have previously determined, taking into account the current configuration, that the CWIS is protective of the environment in accordance with the current 316 (b) requirements.

(C) There are six cooling towers in operation within the refinery. Installation of two additional cooling towers is included in the Whiting Refinery Modernization Project (WRMP). The cooling towers and unit re-configurations of the plant upgrade project are expected to achieve water demand reductions estimated at 16.9 MGD. Though new circulating systems are being installed and evaluated, replacing the entire system with circulating systems is not practicable. Upon finalization of the 316(b) Rule and completion and startup of WRMP, BP will evaluate water reductions provided by the cooling towers

and other process reconfigurations and how those reductions might help the Whiting facility to comply with 316(b) requirements.

(D) The monthly average daily Actual Intake Flow (AIF) is calculated by averaging the daily flows for the days in the month and is provided as a daily average flow rate, summarized below for Years 2009 to 2011, along with the daily design flow.

Design vs. Actual Intake Flow

Month/Year	Monthly Intake Flow (MGD)	
	Design Intake Flow	Calculated Actual Intake
Jan 2009	277.1	102.3
Feb		108.5
Mar		105.0
Apr		95.7
May		95.6
Jun		103.2
Jul		108.5
Aug		107.9
Sep		104.7
Oct		96.5
Nov		89.6
Dec		87.7
2009 Annual	--	100.5
Jan 2010	277.1	86.0
Feb		83.0
Mar		84.0
Apr		88.8
May		91.1
Jun		97.4
Jul		104.5
Aug		106.1
Sep		100.8
Oct		93.5
Nov		86.3
Dec		83.1
2010 Annual	--	92.1
Jan 2011		72.5
Feb		72.0
Mar		58.5
Apr		65.8
May		72.0
Jun		93.1
Jul		93.6

Aug		80.7
Sep	277.1	114.8
Month/Year	Monthly Intake Flow (MGD)	
	Design Intake Flow	Calculated Actual Intake
Oct	277.1	101.1
Nov		86.2
Dec		89.1
2011 Annual	--	83.3

(E) Intake flow is calculated from the discharge of the Lakefront Waste Water Treatment Plant, consumptive use, and water losses that occur within the refinery. Therefore, there is no flow data that can be directly associated with the instantaneous velocity measurements taken at the intake and the 35 psig header pressure. However, as stated in the documentation, the average intake flow calculated for the day of the velocity measurements was 85 MGD.

(F) BP has a water intake and usage registration with the Indiana Department of Natural Resources. BP recognizes that its average cooling water flow needs do not approach Design Intake Flow (DIF) conditions. Monthly calculated intake flows are reported each month and total annual flows are reported to the Indiana Department of Natural Resources (DNR). The DNR is the authority for the state of Indiana responsible for the registration of the intake capacities and allowed withdrawals from the Great Lakes.

Conclusion and Permit Conditions

Based on available information; IDEM has made a Best Technology Available (BTA) determination that the existing cooling water intake structures represent best technology available to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326) at this time based on the following information:

- Average through-screen velocity was measured on November 13, 2009, during a routine intake inspection. The average velocity observed at the 1942 intake was 0.26 feet per second (fps) with a maximum velocity of 0.35 fps. The single velocity measurement for the 1911 intake was made at the center of the intake pipe and had a value of 0.56 fps. At this location it is likely the maximum velocity of the intake pipe velocity field and the average velocity would therefore be less than this value.
- The capacity of all three pump houses that supply water combined to BP is 281.4 MGD and the 2011 annual average water intake rate is 83.3 MGD. The water intake rate over the past several years is in decline due to improvements and recycling efforts at the refinery: 2009 annual average water intake rate = 100.5 MGD; 2010 annual average water intake rate = 92.1 MGD. The 2011 annual average water intake rate is approximately 30 % of the pumping capacity.
- There are six cooling towers in operation within the refinery. Installation of two additional cooling towers is included in the Whiting Refinery Modernization Project (WRMP). The cooling towers and unit re-configurations of the plant upgrade project are expected to achieve water demand reductions estimated at 16.9 MGD.

- BP has a water intake and usage registration with the Indiana Department of Natural Resources. Monthly calculated intake flows are reported each month and total annual flows are reported to the Indiana Department of Natural Resources (DNR). The DNR is the authority for the state of Indiana responsible for the registration of the intake capacities and allowed withdrawals from the Great Lakes.
- The DNR is also responsible for the implementation of the Great Lakes Initiative which regulates the amount of withdrawal, consumption and diversions of the Indiana portion of the Great Lakes. Consumptive losses as well as diversions and design withdraw capacities are capped by the DNR registration.

This determination is based on Best Professional Judgment (BPJ) and will be reassessed at the next permit reissuance to ensure that the CWISs continue to meet the requirements of Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326). IDEM believes that, for reassessment of its BTA determination during the next permit renewal, fish return alternatives must be evaluated during the term of this permit renewal. Focus is placed on this particular evaluation due to the absence of debris screens and fish returns. IDEM wants to know exactly how the absences impact the aquatic life population. The permittee shall comply with the following requirements in the renewed permit:

1. At all times properly operate and maintain the cooling water intake structure equipment.
2. The permittee shall submit a fish impingement and mortality minimization alternatives evaluation and implementation plan to IDEM for review and approval. The evaluation report and implementation plan for any operational changes and/or facility modification shall be submitted to IDEM as soon as feasible, but at least 270 days prior to the expiration date of this permit. The fish mortality minimization alternatives evaluation shall include the feasibility of installing a fish return to Lake Michigan.
3. Inform IDEM of any proposed changes to the CWIS or proposed changes to operations at the facility that affect the information taken into account in the current BTA evaluation.
4. Submit all required reports to the IDEM, Office of Water Quality, Permits Branch

Outfalls 003 and 004

TABLE I
Numeric Discharge Limitations, Sampling, and Monitoring Requirements

<u>Parameter</u>	<u>Quantity or Loading</u>		<u>Units</u>	<u>Quality or Concentration</u>		<u>Units</u>	<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>		<u>Monthly Average</u>	<u>Daily Maximum</u>		<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	Report	Report	MGD	----	----	----	Daily	24-Hr. Total
TOC	-	-	-	Report	110	mg/l	1 x Weekly	Grab
Oil and Grease	-	-	-	Report	15	mg/l	1 x Weekly	Grab
pH	-	-	-	-	[1]	s.u.	1 x Weekly	Grab

[1] The pH of the effluent shall be no less than 6.0 and no greater than 9.0 standard units (s.u.).

Flow

This parameter is required of all NPDES permits and is included in this permit in accordance with 327 IAC 5-2-13(a)(2).

TOC

The effluent limitations for TOC are based on 40 CFR Part 419.23(f) for contaminated runoff.

Oil and Grease

The previous fact sheet stated that the effluent limits for Oil and Grease are based on Indiana Water Quality Standards. The daily maximum limit of 15 mg/l is also equivalent to the technology-based effluent limitation for oil and grease developed in accordance with 327 IAC 5-5-2 representing the permit writer's best professional judgment of the best available treatment.

pH

This parameter is required of all NPDES permits and is included in this permit in accordance with 327 IAC 2-1.5-8(c)(2). pH must be maintained between 6 to 9 standard units. The effluent shall be sampled 1 x weekly using a grab sample.

6.2 Analytical and Sampling Methods

Analytical and sampling methods used shall conform to the current version of 40 CFR 136 as referenced in 327 IAC 5-2-13(d)(1).

6.3 Schedule of Compliance

The circumstances in this NPDES permit do not qualify for a schedule of compliance.

6.4 Special Conditions

Streamlined Mercury Variance (SMV)

Introduction

The permittee submitted a renewal application for a streamlined mercury variance (SMV) in accordance with the provisions of 327 IAC 5-3.5. The SMV establishes a streamlined process for obtaining a variance from a water quality criterion used to establish a WQBEL for mercury in an NPDES permit.

IDEM has conducted a review of the SMV goals contained in the existing permit to determine if BP has achieved those goals in accordance with the permit conditions based on the SMV. IDEM has determined the application to be complete as outlined in 327 IAC 5-3.5-4(e).

BP submitted an SMV progress report to IDEM on August 17, 2012 to satisfy goal No. 1 of the SMV. The progress report contained the following summary of the research conducted by Purdue University and Argonne National Laboratory. Purdue University Calumet (Purdue or PUC) and Argonne National Laboratory (Argonne) have conducted an independent multi-year study, funded by BP, to identify deployable technologies to treat (refinery) wastewater with the objective of meeting the 1.3 ng/l (ppt) Great Lakes Water Quality Criterion for mercury. The final phase, pilot-scale study was conducted at the BP Whiting refinery using a slipstream of wastewater taken just prior to the Effluent to the Lake (pre - ETL) outfall as the influent stream to the pilot. The pilot-scale testing plan involved ultrafiltration and reactive filtration (Blue PRO®) technologies.

Key findings from this phase included:

- The mercury in the feed to the unit was primarily associated with particulates - very little dissolved mercury was measured during the test period.
- Significant variability in mercury concentrations was observed during this study. To obtain a measure of variability, two days of composite sampling events for the ultrafiltration pilot were conducted. These two sampling events showed that the standard deviations were very high and ranged from 41.5 to 59% in feed and membrane backwash samples

Ultrafiltration Pilot Study:

- The UF membrane pilot unit consistently provided permeate that was less than 0.5 ppt total mercury.
- Low membrane fouling rates were calculated during a majority of the study duration, except for one (unexplained) episode of high fouling rate.
- An unexpectedly large solids accumulation was noticed in the membrane unit at the conclusion of the pilot in spite of the regular maintenance and chemical cleanings. However,

accumulation of mercury on the membrane fibers themselves was negligible and did not appear to affect performance.

- The separated mercury concentrated in a reject stream that is still fairly substantial as a percentage of the feed flow. Further testing is therefore needed to determine treatment options for the full scale reject stream.

Reactive Filtration Pilot Study:

- The reactive filtration unit was first operated as a sand filter only mode (without ferric or Nalmet® 1689 polymer addition). Mercury breakthrough was seen in the effluent after 46 days of operation in this mode.
- Bench-scale testing had previously determined that Nalmet® polymer addition was preferable to ferric addition in case sand filtration alone was not sufficient to meet the treatment criterion. Effluent quality, after Hg breakthrough mentioned above, was restored when Nalmet® (at a very high dosage of 25 ppm to each filter) was added to each filter's influent, however, the brevity of these test conditions (three weeks) prevent definitive conclusions from being made regarding long term effectiveness of this approach.
- Mercury accumulation was seen in the filter during both modes of operation. It appeared that this accumulation was enhanced during Nalmet® addition, to the extent that all of the separated mercury appeared to be accumulating in the sand during the Nalmet® addition rather than being concentrated into the reject stream. The capacity of the filter to accumulate mercury before effluent mercury quality is impacted is unknown.
- Further testing is necessary to determine the treatment options for the reject flow from this unit, which contains the concentrated mercury, as well as options to deal with mercury accumulation in the sand bed.

Recommendations by Purdue and Argonne for Further Evaluation Steps

The following are the key recommendations from the Purdue Argonne team for further evaluations:

- Both Purdue and Argonne recommend a longer-term pilot study of ultrafiltration technology at the Whiting refinery. Purdue recommends that the chronological change of the Hg on the used ultrafiltration membrane fibers be monitored. The Hg content of the used membrane fibers is not a concern to Argonne since the total Hg accumulation is minimal based on the overall mass balance calculations on the membrane fibers.
- Argonne does not recommend further pilot testing of the Blue PRO® process until the Hg accumulation in the sand issue is better understood. Argonne recommends that long term testing of the alternative option developed by Argonne, namely, Nalmet® addition prior to the existing sand filters, be conducted prior to any long term Blue PRO® testing. Purdue recommends that if the Blue PRO® process is further considered, long term testing of the Blue PRO® process with Nalmet® addition is needed to determine whether Hg breakthrough would occur.

- Both Purdue and Argonne have concluded that further testing is needed to determine options for appropriate disposal of the ultrafiltration reject, or the backwash from either the Blue PRO® process or the sand filters with Nalmet® addition, which contains concentrated levels of Hg.
- The variability exhibited by samples has been identified as a concern. Argonne suggests that future pilot work should consider the use of grab samples for the rapid preliminary assessment of pilot performance and that these grab samples be supplemented with the use of composite sampling in order to obtain more representative samples and improved process analysis.
- Argonne and Purdue have some operational concerns with pilot unit availability and reliability. The impacts from these are recommended to be closely monitored during further testing.

BP's Next Steps of Evaluation:

Based on these recommendations, and a detailed review of the Purdue Argonne reports, BP proposes the following activities during the next phase of the evaluation:

Both Purdue and Argonne recommend a longer term pilot of ultrafiltration technology. Consistent with the requirements of our permit, BP Whiting will commence a pilot demonstration unit to further review the ultrafiltration (or similar) technology. Operation of the pilot demonstration unit of similar size as the Purdue/Argonne pilot will begin by August 1, 2013. Completion of the pilot demonstration and submission of the final report to IDEM will occur by March 1, 2015. The pilot demonstration evaluation will include the following:

- Because sampling variability has been identified as a significant issue, a longer duration sampling plan with composite and grab samples will be developed and implemented to further evaluate mercury speciation and representativeness in the pilot feed and effluent.
- The evaluation of options for the treatment and disposal of the reject stream will be integrated into the testing plan.
- Performance under varying weather and process conditions as well as reliability operability, and feasibility will be reviewed. The report to IDEM will summarize the results of the pilot demonstration including reliability and feasibility and further recommendations.

Both Purdue and Argonne recommend further evaluation of chemical additive effects with sand filtration. Argonne recommends reviewing these effects before any long term pilot study is implemented for the Blue PRO® reactive filtration technology. In addition BP will evaluate effects of the new Brine Treatment Unit planned to be on line in first quarter 2013 in combination with the new final sand filters to determine any additional mercury removal. Completion of the evaluation and submission of the final report to IDEM will occur by March 1, 2015.

- Evaluation of the effectiveness of the Brine Treatment Unit and the new sand filters in removing mercury will be performed in 2013-2014. Additional benefits from the usage, optimization of dosage, and potential side issues (e.g. toxicity) from the use of precipitants

such as Nalmet® 1689 will be evaluated. Mercury accumulation in the sand filters, as well as capacity before breakthrough, will be monitored and options for the treatment of the backwash stream will also be evaluated. BP will monitor arsenic, benzo(a)pyrene and vanadium from Brine Treatment System to determine the treatment effectiveness on these parameters in addition to Mercury. For permit requirements, see Part IV. H. of the permit.

- Performance under varying weather and process conditions as well as reliability operability, and feasibility will be reviewed. The report to IDEM will summarize the results of the study including reliability and feasibility and further recommendations.

To further address the Evaluation of Wastewater Treatment Technologies for Mercury Removal a Part IV.E. of the permit has been added to put more specific requirements into the permit related to Mercury Removal Technologies.

Term of SMV

The SMV and the interim discharge limit included in Part I.A.1., Discharge limitations Table, will remain in effect until the NPDES permit expires under IC 13-14-8-9 (amended under SEA 620, May 2005). Pursuant to IC 13-14-8-9(d), when the NPDES permit is extended under IC 13-15-3-6 (administratively extended), the SMV will remain in effect as long as the NPDES permit requirements affected by the SMV are in effect.

Annual Reports

The annual report is a condition of the Pollutant Minimization Program Plan (PMPP) requirements of 327 IAC 5-3.5-9(a)(8). The annual report must describe the permittee's progress toward fulfilling each PMPP requirement, the results of all mercury monitoring within the previous year, and the steps taken to implement the planned activities outlined under the PMPP. The annual report may also include documentation of chemical and equipment replacements, staff education programs, and other initiatives regarding mercury awareness or reductions. The complete inventory and complete evaluation required by the PMPP may be submitted as part of the annual report. The permittee will submit the annual reports to IDEM on the anniversary of the effective date of this NPDES permit renewal.

SMV Renewal

As authorized under 327 IAC 5-3.5-7(a)(1), the permittee may apply for the renewal of an SMV at any time but not less than 180 days prior to the expiration of the NPDES permit. In accordance with 327 IAC 5-3.5-7(c), an application for renewal of the SMV must contain the following:

- All information required for an initial SMV application under 327 IAC 5-3.5-4, including revisions to the PMPP, if applicable.
- A report on implementation of each provision of the PMPP.
- An analysis of the mercury concentrations determined through sampling at the facility's locations that have mercury monitoring requirements in the NPDES permit in order to determine a representative mercury discharge concentration to become the interim limit.

- A proposed alternative mercury discharge limit, if appropriate, to be evaluated by the department according to 327 IAC 5-3.5-8(b) based on the most recent two (2) years of representative sampling information from the facility. A review of the Mercury data submitted to IDEM from January 1, 2012 to the most recent data submittal indicated that the highest reported Mercury concentration is 8.75 ng/l. IDEM has determined that this concentration will be the interim mercury effluent limit and this will replace the existing interim limitation of 23.1 ng/l.

Renewal of the SMV is subject to a demonstration showing that PMPP implementation has achieved progress toward the goal of reducing mercury from the discharge. IDEM has reviewed the SMV renewal request and PMPP, and have determined that BP has met all of the PMPP requirements up to this point. BP is scheduled to begin operation of a pilot demonstration unit of similar size as the Purdue/Argonne pilot within eighteen (18) months of the NPDES permit modification incorporating the SMV (August 17, 2013). The effluent characteristics still indicate that the concentration of Mercury in individual samples taken of the effluent from Outfall 005 have not exceeded 8.75 since December 2011. Therefore, the existing variance limit of 23.1 ng/l will be replaced in the final permit with 8.75 ng/l in this permit renewal.

Pollutant Minimization Program Plan (PMPP)

The PMPP is a requirement of the SMV application and is defined in 327 IAC 5-3.5-3(4) as the plan for development and implementation of Pollutant Minimization Program (PMP). The PMPP is defined in 327 IAC 5-3.5-3(3) as the program developed by an SMV applicant to identify and minimize the discharge of mercury into the environment. PMPP requirements (including the enforceable parts of the PMPP) are outlined in 327 IAC 5-3.5-9. In accordance with 327 IAC 5-3.5-6, the permittee's PMPP is hereby incorporated within this permit below:

1. Within 6 months from the effective date of the permit modification to incorporate the SMV requirements (Due date of August 17, 2012), BP will conduct a review of the reports from the Purdue/Argonne pilot study conducted at the Whiting Refinery and submit a report to IDEM summarizing recommendations for further evaluation steps to reduce the discharge of Mercury from the Whiting Refinery. ***This requirement has been achieved by BP.***

If a particular mercury removal technology is recommended for an additional pilot demonstration after completion of the Purdue/Argonne pilot studies conducted at the Whiting Refinery, BP Whiting would commence a pilot demonstration unit to further review the recommended technology(ies) according to the following schedule:

- a. Begin operation of such pilot demonstration unit of similar size as the Purdue/Argonne pilot within eighteen (18) months of the NPDES permit modification incorporating the SMV (August 17, 2013).
- b. Complete the pilot demonstration and submit a final report to IDEM within thirty-six (36) months of the NPDES permit modification incorporating the SMV (March 01, 2015). More specific details can be found in Part IV of the permit.

The pilot demonstration evaluation will include at least the following: performance under varying weather and process conditions, evaluation of options for waste streams, and reliability, operability, and feasibility. The report to IDEM shall summarize the results of the pilot demonstration, including reliability and feasibility of the piloted mercury removal technology, and recommendations for the next phase of review. The final permit includes new language on the evaluation of wastewater treatment technologies for Mercury Removal. This can be found in Part IV.E., F., and G. of the permit.

2. By March 1, 2015, BP will submit a report to IDEM that will include an evaluation of the mercury reduction of the new Brine Treatment unit and final filters that are being installed at the Whiting Refinery. The evaluation will include at least the following: performance under varying weather and process conditions, evaluation of option for waste streams, and reliability, operability and feasibility. The report to IDEM shall summarize the results of the evaluation, including reliability and feasibility of the mercury removal, and recommendation for the next phase of the review. These details are now included in Part IV. of the permit.
3. Within 18 months from the effective date of the permit modification to incorporate the SMV requirements (August 17, 2013), BP will complete the review and identification of mercury containing chemicals or additives that are used in the operations and processes which have the potential risk of entering the process wastewater sewer system.
4. Within 18 months from the effective date of the permit modification to incorporate the SMV requirements (August 17, 2013), BP will compile a complete inventory of all equipment containing mercury that have the potential risk of charging mercury to the process wastewater sewer system, including the estimated mercury content from the vendor and supplier information as well as location of such equipment.
5. Within 24 months from the effective date of the permit modification to incorporate the SMV requirements (February 17, 2014), BP will perform an assessment of the mercury content of the sediment in the main process sewer legs that are part of the current sewer cleaning program.
6. Within 24 months from the effective date of the permit modification to incorporate the SMV requirements (February 17, 2014), BP will complete an assessment of identified process unit wastewater discharges from sources within the refinery that may contain mercury at detection levels utilizing process knowledge, previous analysis or with new analysis if warranted.
7. Within 24 months from the effective date of the permit modification to incorporate the SMV requirements (February 17, 2014), BP will develop a prioritized schedule for the cleaning of the sewers incorporating any significant impacts found from the results of the sewer system characterization study. The sediment and mercury removal progress will be reported in the annual reports.
8. Within 36 months from the effective date of the permit modification to incorporate the SMV requirements (February 17, 2015), BP will complete the detailed inventory list of

process chemicals or additives containing mercury, equipment containing mercury and process discharges that contain mercury

9. Within 36 months from the effective date of the permit modification to incorporate the SMV requirements (February 17, 2015), BP will develop a procedure utilizing a ranking method to identify the high-risk equipment and process chemicals for mercury exposure and alternatives that are feasible for their replacement. Then mercury containing chemicals and equipment will be replaced or substituted with chemicals or equipment containing less mercury or no mercury.

6.5 Spill Response and Reporting Requirement

Reporting requirements associated with the Spill Reporting, Containment, and Response requirements of 327 IAC 2-6.1 are included in Part II.B.2.(d), Part II.B.3.(c), and Part II.C.3. of the NPDES permit. Spills from the permitted facility meeting the definition of a spill under 327 IAC 2-6.1-4(15), the applicability requirements of 327 IAC 2-6.1-1, and the Reportable Spills requirements of 327 IAC 2-6.1-5 (other than those meeting an exclusion under 327 IAC 2-6.1-3 or the criteria outlined below) are subject to the Reporting Responsibilities of 327 IAC 2-6.1-7.

It should be noted that the reporting requirements of 327 IAC 2-6.1 do not apply to those discharges or exceedances that are under the jurisdiction of an applicable permit when the substance in question is covered by the permit and death or acute injury or illness to animals or humans does not occur. In order for a discharge or exceedance to be under the jurisdiction of this NPDES permit, the substance in question (a) must have been discharged in the normal course of operation from an outfall listed in this permit, and (b) must have been discharged from an outfall for which the permittee has authorization to discharge that substance.

6.6 Permit Processing/Public Comment

Pursuant to IC 13-15-5-1, IDEM will publish a general notice in the newspaper with the largest general circulation within the above county. A 30-day comment period is available in order to solicit input from interested parties, including the general public. Comments concerning the draft permit should be submitted in accordance with the procedure outlined in the enclosed public notice form.